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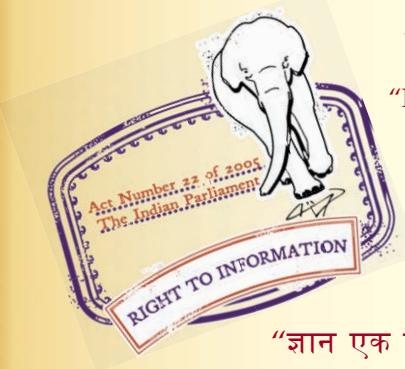
“Step Out From the Old to the New”

IS 7005 (1973): Code for Hygienic Conditions for Production, Processing, Transportation and Distribution of Milk [FAD 15: Food Hygiene, Safety Management and Other Systems]

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Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”





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IS : 7005 - 1973  
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## *Indian Standard*

# CODE FOR HYGIENIC CONDITIONS FOR PRODUCTION, PROCESSING, TRANSPORTATION AND DISTRIBUTION OF MILK

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BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
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# Indian Standard

## CODE FOR HYGIENIC CONDITIONS FOR PRODUCTION, PROCESSING, TRANSPORTATION AND DISTRIBUTION OF MILK

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(Continued on page 2)

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AMENDMENT NO. 1 DECEMBER 1983

TO

IS:7005-1973 CODE FOR HYGIENIC CONDITIONS FOR  
PRODUCTION, PROCESSING, TRANSPORTATION  
AND DISTRIBUTION OF MILK

Alterations

(Page 16, clause 6.4.1, lines 7 and 8) - Delete  
the following:

'urine; and blood examination for venereal diseases.'

(Page 17, clause 6.4.3) - Substitute the following  
for the existing clause:

'6.4.3 All the employees shall be inoculated against  
typhoid and paratyphoid A diseases on their first  
appointment and thereafter once in every five years.  
In case of epidemic, all workers shall be inoculated.  
A record shall be maintained.'

(AFDC 36)

**AMENDMENT NO. 2 JULY 1999  
TO  
IS 7005 : 1973 CODE FOR HYGIENIC CONDITIONS  
FOR PRODUCTION, PROCESSING, TRANSPORTATION  
AND DISTRIBUTION OF MILK**

*(Page 19, clause 6.6.6)* — Substitute the following for the existing:

**‘6.6.6 Pasteurization — Milk shall be pasteurized by the methods given in IS 13688 : 1992 ‘Pasteurized milk — Specification’.’**

*(Page 19, clause 6.6.8)* — Substitute the following for the existing:

**‘6.6.8 Hygienic Standards — The pasteurized milk shall conform to the requirements given in IS 13688’.**

*(Page 20, Table 1)* — Delete.

**(FAD 45)**

## *Indian Standard*

# CODE FOR HYGIENIC CONDITIONS FOR PRODUCTION, PROCESSING, TRANSPORTATION AND DISTRIBUTION OF MILK

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 23 April 1973, after the draft finalized by the Food Hygiene, Sampling and Analysis Sectional Committee had been approved by the Agricultural and Food Products Division Council.

**0.2** Milk contains many essential nutrients, such as carbohydrates, proteins, lipids, minerals and vitamins. Therefore, milk provides an ideal medium for rapid proliferation of most micro-organisms which degrade and alter its composition thus reducing its keeping quality and making it unfit for human consumption. Consequently, during the production, processing, storage and distribution, milk is to be protected from all possible sources producing of microbial contamination and various types of disease organisms including toxin producing types. It is only through improved hygienic practices that potential hazards to public health can be avoided. Hence, this code has been prepared with a view to ensuring supply of clean and safe milk to the consumers.

**0.3** The bulk of enforcement of this hygienic code should be operative at all levels of production, processing and distribution of the milk. Education should be imparted at all the three levels, namely, producers, processors and consumers, in order to make them hygiene conscious.

**0.4** This code is subject to the provisions of the Factories Act, 1948, and the Prevention of Food Adulteration Act, 1954, and the Rules framed thereunder; as amended from time to time.

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### 1. SCOPE

**1.1** This code prescribes the hygienic conditions and hygienic practices for production, processing, storage, transportation and distribution of milk.

## 2. MILK PRODUCTION ON THE FARM

### 2.1 Cattle Shed or Barn

2.1.1 The cattle shed or barn should be so designed as to be comfortable and healthy housing for the cattle (*see IS : 6027-1970\**).

2.1.2 The planning and layout should be such as to provide for adequate facilities for drainage and waste disposal.

2.1.3 Infestation of the place with rodents, houseflies, cockroaches, faeces, sputum, etc, should be prevented.

2.1.4 Facilities should be provided for safe and potable water for drinking, washing udders and flanks of the animals and for washing milker's hands.

2.1.5 The cattle shed or barn should be adequately lighted and ventilated.

2.1.6 The doors of the cattle shed or barn should have well-fitting screens on windows and doors to keep out flies. The windows and doors should be preferably of the swing-type opening outwards.

2.1.7 There should be provisions for proper mangers. Other materials such as damp straw or hay or vegetable refuse should also be not allowed to remain on the floors.

### 2.2 Healthy Cattle

2.2.1 The care and management of healthy cattle is the starting point in hygienic milk production.

2.2.2 The milk should be drawn only from healthy cattle free from diseases that make the milk unfit for human consumption. Animals suffering from contagious diseases including mastitis should be segregated from healthy ones.

### 2.3 Milking Practices

2.3.1 Brushing or feeding of animals at the time of milking should be avoided as it is likely to raise micro-organism laden dust in the cattle shed.

2.3.2 The milker should be healthy and free from contagious diseases.

2.3.3 The milker should wear clean clothes.

2.3.4 The milker should have clean habits. He should not spit or eat or clean his nose during milking. Chewing of betel leaves and smoking during milking should be prevented.

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\*Recommendation for farm cattle housing for large dairy farms.

**2.3.5** Before starting the milking, the milker should wash his hands with soap and water and dry with a clean towel.

**2.3.6** Long hairs on flanks, hind legs, tail and udder should be clipped at frequent intervals.

**2.3.7** Before each milking, the udder and teats of the animal should be effectively washed and cleaned by a spray of clean water and dried with a clean cloth towel.

**2.3.8** Foremilk should not be allowed to run on the floor as it will attract flies which may transmit mastitis to other teats of the same cow or to the teats of other cows. The foremilk should be collected in separate receptacles.

**2.3.9** Abnormal milk should not be allowed to be mixed with normal milk.

## **2.4 Milking Equipment**

**2.4.1** The utensils and equipment used during milking should be of standard quality. They should be constructed from acceptable, non-absorbent and corrosion-resistant materials and should be easily cleanable.

**2.4.2** The utensils and equipment should not have any joints or open seams and should be free from dents, rust, etc.

**2.4.3** The milking utensils and equipment should be thoroughly cleaned and sanitized after each milking ( *see IS : 5253-1969\** ).

**2.4.4** An acceptable, non-toxic and non-corrosive cleaning and bactericidal agent should be used for cleaning and sanitization.

**2.4.5** After cleaning and sanitization, the utensils and equipment should be stored in such a manner and in such a location as to prevent recontamination from flies, insects, dust, dirt, rodents, etc. They should preferably be stored in an inverted position to facilitate drainage of wash water.

## **3. PRODUCTION OF MILK IN VILLAGES**

### **3.1 Collective Society**

**3.1.1** *Yard* — It should have provision of: (a) quick growing hedge all round to act as break against dust and wind, (b) pit for depositing litter and refuse, (c) drain ending into soak pit to carry wash water and liquid excreta, (d) washing platform for animals, and (e) adequate supply of water.

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\*Guidelines for cleaning and sterilizing dairy equipment.

**3.1.1.1** The yard should be kept clean by sweeping daily and should be disinfected with lime dust at the end of each month. To keep down dust, the yard should be sprinkled with water half an hour before milking.

**3.1.2 Milking Shed** — The shed should be maintained in a sound condition and should be provided with suitable floor space with the arrangement to tie the animals and a shallow drain a few metres away from the wall at the other end and joining the drain provided in the yard (*see IS : 5284-1969\**). The exposed part of the shed may be covered with close-mesh netting or alternatively by other suitable means. Parapet walls should be white-washed every month and other parts every quarter. The ceiling of the shed should be cleaned every week and should be free from cobwebs at all times.

**3.1.2.1** Immediately after milking is over, the dung should be removed and the byre should be swept clean, washed with brush and water, taking particular care of corners and crevices, and disinfected with bleaching powder solution of suitable strength.

### **3.1.3 Milk Room**

**3.1.3.1** The doors and windows should be made flyproof, should be dusted regularly and should open outwards.

**3.1.3.2** The ceiling should be cleaned every week.

**3.1.3.3** The floor should be sprinkled with water and finally mopped. After use, the floor should be flushed with water, scrubbed with brush using one percent soda ash and flushed with water, mopped and finally disinfected with one percent bleaching powder solution.

**3.1.4 Utensils** — The following utensils should be used:

- Sanitary milking pails (*see IS : 1517-1959† and IS : 1792-1966‡*),
- Foremilk receptacles,
- Milk measures,
- One bucket for keeping milk measures in clean condition,
- Milk cans of 40 and 20 litre capacities with proper lids, and
- Strainers (*see IS : 1733-1960§ and IS : 1516-1959||*) or straining cloth.

\*Recommendations for community milking shed.

†Specification for milking pails (hooded type), mild steel, tinned.

‡Specification for aluminium milking pails (hooded type) (*revised*).

§Specification for aluminium milking strainers.

||Specification for milk strainers, mild steel, tinned.

**3.1.4.1** All the utensils should be clean and except for the transport cans, should be stored at the society premises.

**3.1.4.2** The transport cans, dusters and the straining cloth should be cleaned and sterilized.

**3.1.4.3** The utensils, including the transport cans, should be cleaned and sanitized according to procedure given in IS : 5253-1969\* before use. The utensils should be drained dry on a wooden stand by keeping with their mouth downwards and covered with muslin. After use the utensils should be cleaned and sanitized again ( *see* IS : 5253-1969\* ).

**NOTE** — The utensils should not be used until the smell of chlorine disappears. The brushes should be thoroughly cleaned before and after use and should be left to dry. The utensils stand should be thoroughly cleaned and disinfected daily.

**3.1.5 Preparation of Animals** — Every member-producer should bring his animals to the milking place in as clean a condition as possible. Before taking to the byre, animals should be groomed and their hind portion ( back half ) washed properly with particular attention to the udder and the switch of the tail. The calf should be allowed to suckle. The udder should be washed and disinfected with chlorine solution ( 200 to 300 ppm of available chlorine ) and then washed with potable water. The milkers should thoroughly wash their hands with soap and potable water.

**NOTE** — Every effort should be made to impress upon the producers to wear clean clothes, to keep their head properly covered and their nails well trimmed for clean milk production.

**3.1.6** The foremilk should be drawn into receptacles provided for the purpose without soiling the hands or dropping on the floor. The milk should be drawn with dry hands. In order to prevent the practice of wet milking and to render milking easier the use of odourless petroleum jelly should be introduced. The milk should be drawn directly into the pail as fast as possible. The milkers should not wipe their hands on the body of the animals or on their person. The switch of the tail should not be touched. The udder should be washed with water and preferably disinfected on completion of milking.

**NOTE** — A producer should deliver the milk of each animal separately. It is desirable to avoid the feeding of animals during milking. The animal however may be fed half an hour before milking or after all the animals of the society have been milked.

**3.1.7** Immediately after milking, each member producer should carry the milk of his animal(s) to the milk room. The milk should be measured by the milk collector without delay, by holding the measure over the milk collecting can. The measures should be emptied directly into the cans through strainers or the straining cloth. On completion of the milking, the collected milk should be immediately transferred to the transport cans

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\*Guidelines for cleaning and sterilizing dairy equipment.

and these cans should be properly sealed. After sealing, thick canvas cap should be placed over the lid and the neck of the can securely tied. The can should be sent to the collection centre as soon as possible. The milk from buffaloes and cows should be brought separately to the milk room.

**NOTE** — During the milk collection, the lid of the can should not be placed on the ground. When not in use the milk measures should be kept dipped in basin containing potable water or a disinfectant solution. Only one milk producer should be allowed into the milk collecting room at a time. The milk should be handled quickly and hygienically and should be despatched immediately after collection.

### 3.2 Individual Milking Societies

**3.2.1 Method of Working** — A plan indicating the location of milking places and the order in which milking is to be done should be prepared. The milk carrier should prepare the milking pail and the milk measures for use by sanitizing them with either scalding water (90 to 95°C) or chlorine solution (200 ppm available chlorine).

**3.2.1.1** Every member producer should be advised to pay attention to the following, half an hour before milking:

- To clean his milking place and surroundings by removal of dung, sweeping and sprinkling of water;
- To wash the back half of his animals with particular attention to the udder, flanks, and hooves and the switch of the tail; and
- To wash his hands thoroughly, wear clean clothes and keep the head properly covered.

**3.2.1.2** The following procedure should be adopted in the production and collection of the milk:

- The milker should inspect every place before starting milking and should satisfy himself that the milking place, animals, etc, have been cleaned; and
- The udder of the animal should be washed and disinfected.

**3.2.1.3** The producer should thoroughly wash his hands with soap and potable water. Milking should be done in clean pails observing the precautions described in 3.1.6. Immediately on completion of milking, the milk should be measured into the milk collecting cans quickly and hygienically and the can should be sealed. The carrier then should wash the milking pails and the milk measures using clean potable water and then sanitize them (see IS : 5253-1969\*). Immediately on completion of milking at the last milking place, the cans containing milk should be sealed and the carrier should take them to the collection centres.

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\*Guidelines for cleaning and sterilizing dairy equipment.

#### **4. MILK RECEPTION AT COLLECTION-CUM-CHILLING CENTRE**

**4.1** A milk collection and chilling centre shall preferably be situated in an open, clean, and healthy surroundings away from road-side where lot of dust arises due to vehicular traffic; garbage dumps; cattle sheds; open sewage drains or other places likely to breed flies. It shall be free from sources of obnoxious fumes, smoke, odours or excessive dust. There shall not be accumulation of trash, garbage or similar waste in the vicinity of the centre.

**4.2** Rooms in the milk collection centre should be clean and risks of contamination should be reduced to the minimum. Adequate provision must be made for cleaning and sterilization of containers and utensils.

**4.3** The floors of the rooms of the collection centre should be constructed of concrete or other impervious material so that it should be easily cleaned. It should be suitably inclined to hasten rapid drainage of wash water.

**4.4** The walls and ceilings of the rooms should have a smooth non-absorbent surface so that they can be efficiently cleaned.

**4.5** The building should be well lighted and adequately ventilated.

**4.6** As soon as the milk is received, it should be subjected to rapid platform tests [ see IS : 1479 ( Part I )-1960\* ]. The accepted milk should be strained and cooled immediately to as low a temperature as possible, preferably to 4.4°C but not less than 10°C, in a plate chiller or by immersing the cans in a tank of chilled water passing over in a surface cooler. The milk shall be maintained below 10°C and should be transported to the dairy as early as possible. Under no circumstances shall the rejected milk be mixed with good milk.

**4.7** Cleanliness of the milk-cooling equipment should be ensured. When surface coolers are used, they should be provided with metal shields for protection from air contamination.

**4.8** Seepage of cooling water into the cans when they immersed in cold water should be prevented.

**4.9** Similarly, seepage of cooling water into the can should be avoided during stirring to hasten cooling of milk.

#### **5. TRANSPORTATION OF MILK FROM THE FARM AND VILLAGES TO THE COLLECTION-CUM-CHILLING CENTRES AND DAIRIES**

**5.1** Raw milk of clean and hygienic quality should be produced on the farm and in villages. Since hand milking is widely practised in India, a

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\*Method of test for dairy industry: Part I Rapid examination of milk.

large amount of visible dirt and other particulate matter which may accumulate in milk should be removed by straining. It is achieved by using a clean piece of cloth or metal strainer containing filter pad which should be replaced as frequently as necessary. The milk should preferably be cooled promptly after milking to 10°C or below.

**5.2** During transportation of milk in cans from the farm and villages to the collection centre, adequate precautions should be taken to ensure that the quality of milk remains the same.

**5.3** Cans should have well-fitting lids. The filled cans should be adequately protected from sunshine. Rain or dirt should not be allowed to come in contact with the inner portion of the can.

**5.4** Water from dripping vegetation or splashes on the road should not be allowed to come in contact with cans.

**5.5** No other material should be loaded on the same vehicle which carries milk cans.

**5.6** When road or rail tankers are used to carry milk, they should be so designed that, as far as possible, agitation is prevented during transport.

**5.7** All the hygienic practices for preservation of milk should be borne in mind while using the tanker system for transporting milk.

**5.7.1** The edge of the manhole in the tanker should be flanged upwards so as to prevent dripping into the tank lid is lifted. A special cover has to be provided over the lid for protection from dust or dirt from the road. Similarly, a cover should be provided over any valve or hose connector.

**5.7.2** Tankers should be so constructed as to be easily cleanable and the design of tankers should conform to best technical and hygienic standards. The cleaning and sanitization of the tankers should be done at the end of operations in accordance with IS : 5253-1969\*.

**5.7.3** The insulation material should be of such quality that the temperature of milk should not be allowed to raise during transportation.

**5.7.4** Violent agitation or surging in the tank should be minimized to avoid breaking of bacterial clumps or alteration of fat globules or admixture of air.

## **6. DAIRY**

**6.1 Site** — The dairy shall preferably be situated in an open, clean, and healthy surroundings away from road-side where lot of dust arises due to

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\*Guidelines for cleaning and sterilizing dairy equipment.

vehicular traffic; garbage dumps; cattle sheds; open sewage drains or other places likely to breed flies. It shall be free from sources of obnoxious fumes, smoke, odours or excessive dust. There shall not be accumulation of trash, garbage or similar waste in the vicinity of the plant.

## 6.2 Building

**6.2.1** Structures housing the dairy shall be suitable in size, construction and design to facilitate maintenance and hygienic operations for processing purposes. It should provide sufficient space for housing of equipment and storage materials ( raw as well as finished products ) necessary for hygienic operations. The material of construction shall be of brick, plaster, cement, concrete, tile or any other equivalent materials which ensure cleanliness.

**6.2.1.1** Construction of the building shall be such that it shall be rodentproof, flyproof and birdproof.

**6.2.2** No portion of building shall be used for domestic purposes or other types of food preparations unless separated by suitable partitions or locations or other effective means.

**6.2.3** *Ventilation and Lighting* — The dairy shall be adequately lighted and ventilated keeping in mind the number of workers, their hours of work and nature of operation. Ventilation and lighting shall also be in accordance with Factories Act, 1948 [ *see also* IS : 3103-1965\* and IS : 3646 ( Part II )-1966† ].

### 6.2.4 Floors, Walls and Ceilings

**6.2.4.1** *Floor* — The floor shall be smooth, washable, properly sloped to gullies connected to sewers or drains. It shall be impervious to water and not affected by weak acids, alkalis or steam. Hard, smooth and impervious flooring, such as cement concrete flooring shall be made for work room, store room and godown.

**6.2.4.2** *Walls and ceilings* — Internal walls and ceilings should have smooth, non-absorbent light-coloured surface, free from crevices and sharp angles, to facilitate their efficient cleaning. The junction of the floor with the walls and the junction between the two walls should be rounded to prevent accumulation of dust.

**6.2.4.3** The dairy floors, walls and ceilings should be regularly cleaned in accordance with IS : 5253-1969‡.

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\*Code of practice for industrial ventilation.

†Code of practice for interior illumination: Part II Schedule for values of illumination and glare index.

‡Guidelines for cleaning and sterilizing dairy equipment.

**6.2.5 Repairs** — The building shall be maintained in a proper state of repair and cleanliness at all times. Whenever required, it may be lime washed, painted, disinfected, disinfested and deodorized.

**6.2.6 Processing Room** — The room shall be made flyproof and rodent-proof. The floor shall be impervious to water and shall have a sufficient slope to ensure adequate drainage. Drains in processing rooms shall be cemented and covered with detachable covers. Drains shall be kept clean and shall be provided with traps at suitable places before they are connected with the municipal drain to avoid blocking or choking, or in the absence of any such arrangement, they shall be drained in soakage pits situated at a suitable distance from the dairy and also the source of water supply. Adequate facilities for washing the room shall be provided. Adequate number of wash basins and sinks shall be provided.

**6.2.6.1** Proper ventilation shall be maintained to prevent condensation and drippage. Exhaust fans shall be provided where necessary.

**6.2.7 Doors and Windows** — The processing rooms shall be provided with effective means to prevent the entry of flies and insects. Such effective means may be screens, fans, etc. The processing rooms should be provided with self-closing double doors. The doors and windows should be covered with flyproof wire gauge, and they should open outwards.

**6.2.8 Drainage** — Effective drainage should be provided to drain off a large quantity of water used for washing the machinery, equipment, furniture, floor, etc; 15 to 30 cm half circular drains with glazed pipe at the bottom should be provided. The slope of the floor should be towards the drains and the farthest end of the floor from the drain should not be more than 5 metres. The drain openings should be provided with screen traps to prevent solid matter from clogging the drains. The ends of the drains leading to the outside of the factory should be made rodentproof by providing screens. The screens shall be examined periodically and replaced or cleaned, if necessary. The drains should have water seals of minimum 5 cm. At least 50 percent of the length of the drain should be covered to facilitate the movement of trolleys. Mesh type cover for the drain should be better to prevent habitation of cockroaches and rodents in closed areas of the drain.

## 6.3 Dairy and Processing Hygiene

### 6.3.1 General Dairy Hygiene

**6.3.1.1** Waste and refuse shall be collected in covered receptacles and shall not be allowed to scatter on the floor of the unit. It should be disposed of in a manner which is not detrimental to the hygiene of the surroundings of the disposal.

**6.3.1.2** Adequate measures shall be taken to prevent mould growth on equipment and internal structures of processing and storage rooms. Adequate steps shall be taken to prevent infestation of cockroaches and other household pests.

**6.3.1.3** When pesticides are used, due care shall be exercised to prevent contamination of equipment, raw materials and packing materials. Under no circumstances shall these be used during processing.

**6.3.1.4** Floors and drains shall be kept clean.

**6.3.1.5** On no account shall the process room be used or converted to a store room for raw materials or used as eating room. Only the items required for processing on a particular day shall be kept in the process room.

**6.3.1.6** No lavatory, sink, cesspool or garbage shall be so situated or maintained that odours or fumes therefrom pervade any room where the milk is stored or processed.

**6.3.1.7** Proper places shall be provided for storage of brooms, brushes, buckets and other cleaning gear.

**6.3.1.8** The dairy effluents shall be disposed in a manner which is not detrimental to the hygiene of the dairy and its surroundings. The effluents shall not be let off on road or in the open outside the dairy premises.

**6.3.1.9** Window glass and light fittings shall be maintained clean and dust-free at all times.

**6.3.1.10** There shall be no cobwebs in any part of the dairy. Birds and domestic animals shall not be allowed in any part of the dairy.

**6.3.1.11** All plumbing and waste disposal lines should be large enough to carry peak loads. All lines should be water-tight and the waste disposal should be effected in such a manner as not to cause contamination with potable water-supplies.

**6.3.1.12** Premises should be well lit and ventilated (see 6.2.3). Special attention should be given to equipment producing excessive heat, steam, obnoxious fumes or vapours. Good ventilation should be provided and mould growth in overhead structures should be prevented. Light bulbs and fixtures suspended above should be of safety type.

### **6.3.2 Plant and Equipment Hygiene**

**6.3.2.1** *Material for equipment* — All surfaces coming into contact with the milk shall be smooth, free from pits, crevices and loose scale and shall

be non-absorbent. Furthermore, the surface shall be non-toxic and unaffected by milk and cleaning compounds. The finish of corrosion-resistant ( stainless steel, aluminium alloy, tinned mild steel, etc ) surfaces shall be smooth.

**6.3.2.2** All gasketing materials shall be non-porous, non-absorbent, and fitted in a manner such as to prevent its protruding into the milk or creating recesses or ledges between the gasketed joints which will interfere with proper cleaning.

**6.3.3 *Installation of Equipment***

**6.3.3.1** All equipment shall be installed on a foundation of durable, easily cleanable material.

**6.3.3.2** Equipment shall be placed at least 45 cm from wall and ceiling, or sealed water-tight thereto. All portions of the equipment shall be installed sufficiently spaced above the floor on a minimum number of supporting members to provide access for inspection and cleaning, or be installed completely sealed ( water-tight ) to the floor.

**6.3.3.3** Whenever equipment passes through walls or floors, it shall be sealed thereto or sufficient clearance shall be allowed to permit inspection, cleaning and maintenance.

**6.3.3.4** Where necessary, drains and catch pans shall be provided. These shall be of such dimensions as to collect all spill and drip, and readily accessible or readily removable for cleaning.

**6.3.3.5** Where pipes pass through ceilings into the floor of the processing area above, pipe sleeves shall be inserted in the floor above so that their upper periphery is at least 5 cm above the floor.

**6.3.4 *Connections* —** All electrical connections, such as switch boxes, control boxes, conduit and cables, shall be installed at least 45 cm away from the equipment walls to facilitate cleaning, or be completely sealed to the equipment or wall.

**6.3.5** All equipment coming into contact with milk shall be kept clean. An ample supply of steam and water, hose, brushes, detergents and other equipment necessary for the proper cleaning of machinery and equipment shall be available. All equipment should be cleaned and sanitized in accordance with IS : 5253-1969\*.

**6.3.6** All parts of equipment coming in contact with milk shall be sterilized by steam or any other suitable sterilizing agent after each processing run.

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\*Guidelines for cleaning and sterilizing dairy equipment.

**6.3.7** The entire processing system shall be cleaned at the close of operation and flushed out with potable water prior to use.

**6.3.8** Contaminating stores and spare parts of machinery shall be kept separate from the processing areas.

**6.3.9** Bottles, pails, cans and other containers used to transport or store milk shall be kept clean and not used for any other purpose.

**6.3.10** *Container Cleanliness* — It shall be ensured that containers are clean. The containers shall not be stacked in a manner which allows the contamination of the product.

#### **6.3.11 Water Supply**

**6.3.11.1** There shall be an adequate supply of safe and potable water (see IS : 4251-1967\*). Running water under pressure shall be easily accessible to all rooms and areas in which milk is handled and equipment are washed.

**6.3.11.2** The equipment shall be so installed and used that back siphonage of liquid into the potable water lines is precluded.

**6.3.11.3** Hot and cold water in ample supply shall be provided for plant clean-up needs, where necessary.

**6.3.11.4** The storage tanks for water should, unless completely sealed, be kept covered with tight fitting lids, examined regularly and cleaned out at least once every six months. The date of the last cleaning and next cleaning shall be prominently displayed on the storage tanks.

**6.3.11.5** The water shall be periodically examined as desired by the licensing authority, chemically and bacteriologically. A record of such examination shall be maintained.

#### **6.4 Employee Hygiene**

**6.4.1** Every person employed in connection with production, handling, processing and distribution of milk shall be medically examined by an authorized registered medical practitioner and the examination shall include X-Ray of the chest for tuberculosis. The examination shall also include : examination of stool for protozoal and helminthic infestation for those parasites which are transmitted by ingestion, and for the presence of *Salmonella*, *Shigella* species and *Vibrio cholerae*; urine; and blood examination for venereal diseases. Subsequently, the employee shall be medically examined once in a year or more frequently; if necessary, to ensure that he is medically fit and free from communicable diseases. A record of such examination shall be maintained.

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\*Quality tolerances for water for processed food industry.

**6.4.1.1** It shall be impressed on all employees that they should notify the medical officer or management, cases of fever, vomiting, diarrhoea, typhoid, dysentery, boils, cuts and sores and ulcers ( however small ), discharging ears and notifiable diseases occurring in their own homes and families.

**6.4.1.2** No worker who is suspected to be suffering from any of the disorders listed in **6.4.1.1** shall be permitted to work inside the dairy. The supervisor shall check the personal hygiene of the workers before the start of work and whenever they enter any processing room after any absence.

**6.4.2** Employees shall keep their finger nails short and clean and wash their hands with soap or detergent and water before commencing work and after each absence, specially after using sanitary conveniences. Towels used for drying hands should be clean. No worker shall allow his hands or any part of his body or clothing to come in contact with the milk. He should adopt strict hygienic practices so as to avoid adding any microbial contamination to the milk.

**6.4.3** All employees shall be inoculated and vaccinated against the enteric groups of diseases once a year and against small pox once in two years. In case of an epidemic all workers shall be inoculated. A record shall be maintained.

**6.4.4** No worker shall be allowed to work without proper clothing and foot wear.

**6.4.5** Employees shall be provided with clean uniforms ( preferably white ) or aprons or both and clean washable caps, where necessary.

**6.4.5.1** Separate room or place for changing the clothes shall be provided. The clothes shall not be hung in any processing room.

**6.4.5.2** The uniforms shall not be worn outside the dairy but put on just before starting the work and changed when leaving.

**6.4.6** Eating, spitting, nose cleaning or the use of tobacco in any form including smoking or chewing betel leaves shall be prohibited within the processing, packing and storage area of the dairy. Notice to this effect shall be prominently displayed and enforced.

**6.4.7** Sufficient and suitable sanitary conveniences shall be provided, maintained and kept clean. The conveniences shall be properly lighted. Separate conveniences shall be provided for each sex. No convenience shall open directly into any work room in the dairy. The conveniences shall always be maintained clean and in good repairs.

**6.4.8** Sufficient number of wash basins with adequate provision of nail brushes, soap and towels, latrines and urinals in the prescribed manner

should be provided, conveniently situated and accessible to workers at all times while they are at the dairy (*see* also Table 3 of IS : 1172-1971\*). The wash basins shall be installed in or alongside the sanitary conveniences.

**6.4.9** The important of hygienic and aesthetic standards should be inculcated to the personnel, since carelessness at any stage will endanger the health of the consumers.

## **6.5 Milk Reception**

**6.5.1** It is the key stage in regard to quality of milk. The milk reception room shall be separate from the processing room and it shall have a well equipped laboratory for inspection of milk supplies.

**6.5.2** Samples from each can or farm tanker shall be subjected to organoleptic and bacteriological tests. Bulk milk or individual producers' milk shall also receive the same requirements.

**6.5.3** Milk received for processing shall be fresh and sweet and free from off flavours or other defects and shall be of low bacterial count [*see* IS : 1479 (Part III)-1962†].

**6.5.4** Rapid platform tests should be performed on all samples of milk received according to procedure given in IS : 1479 (Part I)-1960‡. The raw milk should be immediately cooled to 10°C or below if not processed early.

## **6.6 Milk Processing**

**6.6.1** Prior to processing, raw milk shall be filtered or clarified to remove visible dirt and any other foreign material in it.

**6.6.2** The milk may be homogenized before pasteurization at appropriate pressure.

**6.6.3** After completion of the day's run, the parts of the homogenizer shall be dismantled and thoroughly washed with detergent solution followed by rinsing with hot water (*see* IS : 5253-1969§).

**6.6.4** Before using fresh batch of milk, the homogenizer shall be sterilized by pumping through it hot water or chlorine solution (*see* IS : 5253-1969§).

**6.6.5** The piston packing and leather gaskets of the homogenizer when worn out, shall be replaced as frequently as possible.

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\*Code for basic requirements for water supply, drainage and sanitation (*second revision*).

†Method of test for dairy industry: Part III Bacteriological analysis of milk.

‡Method of test for dairy industry: Part I Rapid examination of milk.

§Guidelines for cleaning and sterilizing dairy equipment.

**6.6.6 Pasteurization** — The milk shall be heated to at least 63°C and held at 63°C continuously for at least 30 minutes, or it shall be heated to at least 71.5°C and held at 71.5°C continuously for at least 15 seconds in a standard and properly operated equipment. Other temperature and time combinations that enable the pasteurized milk to meet the hygienic requirements given in Table 1 may also be adopted after approval by competent authority. To ensure that the bacteria present in the foam are killed, space heaters should be provided. The clear positioning and accuracy of the indicating and recording thermometers shall be checked regularly. The long stem indicating thermometer shall be accurate within  $\pm 0.5^{\circ}\text{C}$ . The recording thermometer shall be accurate within  $1^{\circ}\text{C}$  between 63 and 64°C for holder pasteurization and within  $1^{\circ}\text{C}$  between 71 and 72°C for high temperature short time (HTST) pasteurization.

**6.6.6.1** After holding the milk, it should be cooled immediately in the standard and properly operated equipment to a temperature not exceeding 5°C.

**6.6.6.2** The pasteurized milk should be maintained at a temperature not exceeding 10°C until it leaves the milk plant for distribution.

**6.6.6.3** All parts of the pasteurizer should be kept in a hygienic condition. Appropriate type of detergent-sanitizers which do not adversely affect the quality of milk should be used for effective cleanliness and sterility of the pasteurization plant (*see IS : 5253-1969\**). The rubber gaskets of the pasteurizer need special attention in regard to cleaning operations because of the deposition of milk residues.

**6.6.7** All possible precautions shall be taken to avoid recontamination of raw milk after pasteurization through improperly designed or leaky equipment; pumps, dirty bottles and bottling equipment, contaminated water, dust flies and from dirty habits of dairy plant personnel.

**6.6.8 Hygienic Standards** — The pasteurized milk in dairy plant shall conform to the requirements given in Table 1.

**6.6.9** Pasteurized milk shall be filled in suitable containers or bottles of standard quantity (*see IS : 1392-1971†*). The bottles shall be so shaped as to permit effective cleaning operation. The containers should not have inaccessible corners where milk deposits or scales are likely to accumulate or difficult to clean.

**6.6.10** The returned empty bottles shall be appropriate cleaned and sanitized using suitable detergent and sanitizer (*see IS : 5253-1969\**).

**6.6.11** The bottle fillers should also be adequately cleaned and sanitized.

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\*Guidelines for cleaning and sterilizing dairy equipment.

†Specification for glass milk bottles (*second revision*).

**TABLE 1 REQUIREMENTS FOR PASTEURIZED MILK**

(Clause 6.6.8)

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO CLAUSE
(1)	(2)	(3)	(4)
i)	Phosphatase test	Negative	26 of IS : 1479 ( Part II )-1961*
ii)	Presumptive coliform test, in 1 : 10 dilution	Absent	8.5.1 of IS : 1479 ( Part III )-1962†
iii)	Standard plate count, per ml, <i>Max</i>	50 000	5 of IS : 1479 ( Part III )-1962†

\*Method of test for dairy industry : Part II Chemical analysis of milk.

†Method of test for dairy industry : Part III Bacteriological analysis of milk.

**6.6.12** The filled bottles shall be sealed with aluminium foil caps of appropriate quantity ( *see* IS : 1705-1960\* ).

**6.7 Laboratory Control** — The control dairy laboratory plays a vital role in checking the efficiency of milk processing. A well equipped laboratory with competent quality control staff are essential for an efficient operation of milk processing plant. Depending upon the quantity of milk handled by each dairy, appropriate layout plan may be formulated according to IS : 2981-1964†.

### **6.8 Milk Distribution**

**6.8.1** Pasteurized milk should not be allowed to be contaminated during distribution which shall be effected in the most hygienic and efficient way.

**6.8.2** Temperature of milk during distribution should not rise above 10°C at delivery.

**6.8.3** Pasteurized milk should be distributed in suitably sealed bottles or cartons. In case of bulk delivery, the cans should have well fitting lids and previously sealed at the dairy.

**6.8.4** Distribution of pasteurized milk should be permitted only from authorized and adequately supervised distribution points.

**6.8.5** Adequate cold storage facilities shall be provided at all distribution points.

\*Specification for aluminium foil for milk bottle caps.

†Layout plan for dairy laboratories.

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